

EXPERIMENTAL ANALYSES OF "HYPNOTIC" BEHAVIOR:

A REVIEW OF RECENT EMPIRICAL FINDINGS¹

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Experiments are reviewed that were designed to delineate the instrumental variables in eliciting objective and subjective responses to test suggestions of body immobility, analgesia, hallucination, deafness, selective amnesia, and so on, that is, in eliciting behaviors of the type traditionally termed "hypnotic." The question at the forefront of discussion is: In producing "hypnotic-like" behavior, what are the relative effects of (a) S's personality characteristics, and of instructional-situational variables, such as (b) defining the situation to S as "hypnosis" or "control," (c) administering task-motivational instructions, (d) administering suggestions of relaxation, drowsiness, and sleep, and (e) suggesting to S that he can now easily respond to test suggestions?

Weitzenhoffer and Sjöberg (1961) and Barber and Glass (1962) recently demonstrated experimentally that "hypnotic induction procedures" are effective, as compared to an uninstructed control condition, in facilitating objective and subjective responses to test suggestions of the type comprising the Stanford Hypnotic Susceptibility Scale and the Barber Suggestibility Scale (BSS), e.g., test suggestions of limb rigidity, body immobility, hallucination, and amnesia. However, the hypnotic induction procedures used in these experiments, and in most other recent experiments, included at least four distinct independent variables: (a) the situation was defined to the subject as hypnosis; (b) motivational instructions were administered e.g.,

in participating here you are contributing to scientific knowledge. . . . All I ask of you is that you keep up your attention and interest and continue to cooperate. . . . Most people find this a very interesting experience . . . [Weitzenhoffer & Hilgard, 1959, pp. 9, 14].

(c) repeated suggestions of eye-heaviness, eye-closure, relaxation, drowsiness, and sleep were administered; finally, (d) it was suggested to the subject that he could now easily respond to test suggestions and could easily experience the suggested effects e.g.,

You will be able to do all sorts of things I ask you to do. . . . You are going to experience many things I will tell you to experience . . . [p. 16].

It should be noted that the subjects participating in the Weitzenhoffer and Sjöberg and in the Barber and Glass experiments received motivational instructions under the hypnotic induction condition but not under the control condition.

The first question posed in the present review is: Suppose an attempt had been made to motivate the controls to perform to the best of their ability on experimental tasks. Would such a motivated group have been as responsive, overtly and subjectively, or less responsive to the test suggestions than the group that received the hypnotic induction? After an answer to this question is provided, the review focuses on the four independent variables that are typically included in present-day hypnotic inductions, and asks: are each of these variables effective, or are some ineffective, in facilitating response to test suggestions? What is the relative contribution of each effective variable? Do the variables interact to facilitate suggestibility? Upon summarizing a series of experiments that was designed to answer these questions, a final query is posed: what are the effects of personality factors and of several relatively subtle instructional-situational factors, such as implicit suggestions, that the procedure to be employed is effective in inducing hypnosis?

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Since the majority of experiments pertinent to the above questions were conducted in the writer's laboratory, the present paper constitutes primarily a summary of recent research by the writer and his collaborators. Focusing on a limited set of questions, no attempt is made to review all recent experimental work concerned with hypnotic behavior. For broad coverage of other recent studies in this area, which asked different questions than those asked here, the reader is referred to Barber (1961a, 1962a, 1962b, 1964b, 1964e, 1965b), Gordon (in press), Hilgard (in press), and Schneek (1963).

TABLE 1

INDEPENDENT VARIABLES TYPICALLY INCLUDED IN
PRESENT-DAY "HYPNOTIC INDUCTION
PROCEDURES"

1. The situation is defined to the subject as "hypnosis."
2. Instructions are administered that are designed to motivate the subject to give a good performance.
3. Suggestions of eye-heaviness, eye-closure, relaxation, drowsiness, and sleep are administered.
4. It is suggested to the subject that he can now easily respond to test suggestions and can easily experience suggested effects.

PART I. THE SUGGESTIBILITY-ENHANCING EFFECTS OF "HYPNOTIC INDUCTION PRO- CEDURE" AND OF "TASK MOTIVA- TIONAL INSTRUCTIONS"

A series of recent experiments were designed (a) to ascertain whether brief instructions intended to motivate the subject to perform well in the test situation ("task motivational instructions") are effective in facilitating response to test suggestions, and (b) to compare the effects on suggestibility of task motivational instructions and of a standardized procedure of the type commonly termed a hypnotic induction. The dependent variables in these experiments included response to the BSS plus response to suggestions of auditory and visual hallucination, enhanced strength and endurance, enhanced learning-cognitive proficiency, analgesia, and deafness. Experiments concerned with these and other dependent variables are reviewed in turn.

Barber Suggestibility Scale

Barber and Calverley (1962, 1963b, 1963c) carried out a series of similar experiments, each of which included at least three treatment groups. One group received a standardized 15-minute hypnotic induction procedure. This procedure, which was patterned after the induction procedures of Friedlander and Sarbin (1938), Marcuse (1959, p. 53), and Weitzenhoffer and Hilgard (1959), included the four variables listed in Table 1. The experimental treatment for the second group consisted of task motivational instructions, administered for 60 seconds, designed to pro-

duce positive motivation to perform well in a situation defined to the subject as "a test of imagination":

I'm going to test your ability to imagine and to visualize. . . . Everyone passed these tests when they tried. . . . What I ask is your cooperation in helping this experiment by trying to imagine vividly what I describe to you. . . . If you try to imagine to the best of your ability, you can easily imagine and do the interesting things I tell you. . . .

A third group (Control) was also told that it was to receive a test of imagination but this group received neither a hypnotic induction nor task motivational instructions. All groups were tested on objective and subjective responses to the BSS which includes eight standardized test suggestions. (Since the BSS will be referred to often below, it is summarized for convenience of reference in Table 2.) Each of the experiments in this series yielded essentially the same results: (a) the group given the standardized 15-minute hypnotic induction procedure and the group given the 1-minute task motivational instructions were significantly more responsive to the BSS than the control group; and (b) the hypnotic induction group and the task motivational group did not differ significantly from each other on either objective or subjective responses to the BSS.

In summary, the three experiments in this series indicated that brief task motivational instructions are about as effective as a standardized procedure of the type traditionally labeled as a hypnotic induction in facilitating objective and subjective responses to suggestions of arm levitation, thirst "hallucination,"

TABLE 2
BARBER SUGGESTIBILITY SCALE

Test Suggestions

1. Arm Lowering

"Imagine that your right arm is feeling heavier and heavier . . . it's moving down and down . . . [Barber & Calverley, 1963a, p. 590]."

2. Arm Levitation

"Imagine that the [left] arm is becoming lighter and lighter . . . it's moving up and up . . . [p. 590]."

3. Hand Lock

"Imagine that your [clasped] hands are two pieces of steel that are welded together . . . it's impossible to pull your hands apart. . . . Try, you can't . . . [p. 590]."

4. Thirst "Hallucination"

"Imagine that you've just finished a long, long walk in the hot sun. . . . You feel thirstier and thirstier, dry and thirsty . . . [p. 591]."

5. Verbal Inhibition

"Imagine that the muscles in your throat and jaw are solid and rigid. . . . The harder you try to say your name the harder it will become. Try, you can't . . . [p. 591]."

6. Body Immobility

"Imagine that you've been sitting in that chair so long that you're stuck to it . . . stuck in the chair; you can't stand up . . . try, you can't . . . [p. 591]."

7. "Posthypnotic-Like" Response

"When this experiment is over . . . I'll click like this and you'll cough automatically . . . [p. 591]."

8. Selective Amnesia

"You'll remember all the tests . . . all except for . . . the one where I said your arm was becoming lighter and moving up . . . you will not remember until I [say] 'Now you can remember'. . . [p. 591]."

Scoring Criteria

Objective scores: Criteria used to score responses objectively (together with norms and reliability data) are presented in Barber and Glass (1962), Barber and Calverley (1963a), and Barber, Karacan, and Calverley (1964). The maximum objective score obtainable on the scale is eight points (one point for each test suggestion passed).

Subjective scores: Immediately after the scale has been administered and scored objectively, the experimenter describes each of the test suggestions that the subject has passed with an objective score of either one half of one point and asks, "Did you actually feel [the suggested effect] or did you go along with the suggestion in order to follow instructions or to please me?" Subjective scores are assigned as follows: one point for each test suggestion that the subject states that he "actually felt."

body immobility, inability to speak one's name, selective amnesia, and the other test suggestions described in Table 2. This finding gives rise to an important question: Are task motivational instructions also effective in facilitating response to test suggestions other than those included in the BSS (for instance, suggestions intended to produce auditory and visual hallucinations)? If task motivational instructions are effective in facilitating responses to such suggestions, how effective are they as compared with a hypnotic induction procedure?

Auditory and Visual Hallucinations

A series of clinical and experimental studies, reviewed elsewhere (Barber, 1964f) indicated that auditory and visual hallucinations can at times be evoked from subjects who have received a hypnotic induction by suggesting to them that they shall hear sounds and see objects that are not present. Until recently, however, no one had attempted to ascertain whether similar hallucinatory behavior can be elicited, without a hypnotic induction, by instructions designed to motivate subjects to try to hear and to see nonpresent stimuli.

Barber and Calverley (1964a) included this comparison in a recent experiment, described below.

Seventy-eight female volunteers were individually pretested as follows: (a) Immediately upon being seated in the experimental room the subject was informed that the experiment would begin at once and was told, firmly and seriously, to close her eyes and to hear a phonograph record playing a specified tune. (b) After 30 seconds she was asked to open her eyes and to check a standardized rating scale regarding the vividness and realism of the suggested auditory hallucination. (c) The subject was next given suggestions, in a firm tone of voice, to see a cat sitting on her lap and, finally, (d) she was asked to check a second rating scale with regard to the vividness and reality of the suggested visual hallucination.

In the same experimental session, each subject was retested individually on equivalent hallucination suggestions (to hear a record playing another tune and to see a dog sitting on her lap) after the administration of one of three experimental treatments. Twenty-six subjects were randomly assigned to each treatment group. Subjects allocated to Group 1 were given the suggestions to hallucinate after receiving a standardized 15-minute hypnotic induction procedure (which included the variables listed in Table 1). The subjects assigned to Group 2 were given the identical suggestions to hallucinate after receiving task motivational instructions ("This time I want you to really try to see and to hear the things I ask you to. . . . Don't assume that it can't be done. It's really quite easy . . ."). Subjects assigned to Group 3 (Control) received the identical suggestions to hallucinate that were given to Groups 1 and 2, but without receiving a hypnotic induction or task motivational instructions. Analyses of variance and covariance showed that Groups 1 and 2 did not differ significantly from each other but both groups were significantly more responsive to the suggestions to hallucinate than Group 3. That is, response to the hallucination suggestions was enhanced to a comparable degree (above the subjects' own pretest level and also above the retest level manifested by the Control group) by the hypnotic

induction procedure and also by the task motivational instructions.

Enhanced Strength and Endurance

Several studies (e.g., Hadfield, 1924; Ikai & Steinhaus, 1961; Wells, 1947) indicate that suggestions of enhanced strength and endurance, given subsequent to a hypnotic induction procedure, tend to facilitate performance on physical tasks. These studies, however, did not include a comparison group given similar suggestions of heightened strength and endurance without a hypnotic induction. Orne (1959), Levitt and Brady (1964), London and Fuhrer (1961), and Barber and Calverley (1964) have recently conducted experimental studies that included this required comparison group.

Orne (1959) worked with nine selected "hypnotizable" male subjects. Each was tested on a weight-holding endurance task, first under a hypnotic induction condition and then under a task motivational condition. Under the hypnotic induction condition, suggestions were given that the subject would not experience pain or fatigue and would manifest a high level of performance. Under the task motivational condition the subjects were told that females are able to hold the weight for a certain period of time (which was equal to the subject's performance under the hypnotic induction condition), and that the subject would receive a small monetary reward if he surpassed the performance typical of females. Seven of the nine subjects manifested increased endurance under the task motivational condition. When the remaining two subjects were given a second chance with additional task motivational instructions, they too exceeded the performance they had manifested under the hypnotic induction condition. Although this study suggested the possibility that task motivational instructions given without hypnotic induction may be more effective than suggestions for high performance given subsequent to a hypnotic induction, it did not conclusively demonstrate this point. The experimental conditions were not counterbalanced and the possibility was not excluded that the higher level of performance manifested under the second treat-

ment (task motivation) may have been due to familiarity with or practice on the task.

Levitt and Brady (1964) compared weight-holding endurance in eight female subjects under three counterbalanced experimental conditions: (a) a hypnotic induction condition; (b) a hypnotic induction condition that included suggestions of anesthesia of the arm and shoulder; and (c) a task motivational condition comprised of verbal exhortation plus monetary reward for high performance. Weight-holding endurance did not differ significantly under the three conditions.

London and Fuhrer (1961) worked with 32 female subjects. In the first session, the subjects were tested under counterbalanced hypnotic induction and nonhypnotic induction conditions for grip strength and weight-holding endurance. In the second session, they were retested on the same tasks under counterbalanced hypnotic induction and nonhypnotic induction conditions with task motivational instructions administered under both conditions: "give it everything you've got . . . make this a total effort . . . let me see how really far you can go!" Results were: hypnotic induction, without task motivational instructions, did not affect either strength or endurance; task motivational instructions, given with and also without a preceding hypnotic induction, facilitated strength and endurance. London and Fuhrer concluded that "hypnosis as such adds nothing magical to performance. Motivational instructions are clearly more important than hypnotic trance."

Barber and Calverley (1964) conducted an experiment along similar lines. Sixty female volunteers were first individually pretested on a grip strength and a weight-holding endurance task and then were retested on the same tasks under one of four experimental treatments, with 15 subjects assigned at random to each treatment. The experimental treatment for one group (task motivation) consisted of instructions designed to produce positive motivation to perform maximally: "It is possible for everyone to increase their strength tremendously when they set their mind upon doing much better. . . ." A second group was given a hypnotic induction procedure, which included the variables listed in Table 1, followed by suggestions of enhanced strength

and endurance. A third group received a hypnotic induction but did not receive task motivational instructions. A fourth group (Control) was retested without special instructions or suggestions. With respect to the grip strength task, analyses of variance and covariance failed to show significant differences among the four groups. With respect to the weight-holding endurance task, subjects receiving the hypnotic induction *without* suggestions of enhanced endurance showed a decrement in performance on retest as compared to pretest. However, subjects receiving the hypnotic induction together with suggestions of enhanced endurance, and also subjects receiving task motivational instructions without a hypnotic induction, manifested improved performance on retest as compared to their own pretest performance and also as compared to the retest performance of the control group.

In brief, the above experiments appear to be in line with previous studies, reviewed in detail elsewhere (Barber, in press), which indicated that suggestions of enhanced strength and endurance given subsequent to a hypnotic induction procedure tend to facilitate performance. In addition, the above experiments extend previous studies in indicating that whatever improvement in performance can be produced by suggestions of enhanced strength and endurance given under a hypnotic induction condition can also be produced by task motivational instructions given without a preceding hypnotic induction.

Enhanced Learning-Cognitive Proficiency

A series of experiments (e.g., Hammer, 1954; Illovsky, 1963; Sears, 1955), recently reviewed elsewhere (Barber, 1965a), indicated that suggestions of enhanced learning-cognitive proficiency, given subsequent to a hypnotic induction procedure, tend to facilitate performance on some, but not all, intellectual tasks. A crucial comparison condition was not included in these experiments: suggestions for enhanced learning or cognitive proficiency given without a hypnotic induction. Salzberg (1960a, 1960b), Fowler (1961), and Parker and Barber (1964) recently conducted experiments that included this comparison.

Salzberg (1960a, 1960b) tested three experimental groups on one simple and two relatively complex intellectual tasks (simple counting, memory for nouns, and abstract reasoning). Group 1 received a hypnotic induction procedure and suggestions for high performance (task motivational suggestions). Group 2 was treated in the same way as Group 1 with the exception that subjects in Group 2 performed the tasks after they were told to "awaken" from hypnosis. Group 3 received the identical task motivational suggestions that were given to Groups 1 and 2 without a hypnotic induction. In general, Groups 1 and 2 performed more proficiently on the tasks than Group 3. However, the subjects had not been randomly assigned to the three experimental groups. Subjects allocated to Groups 1 and 2, but not to Group 3, were preselected for "hypnotizability." Operationally, criteria for hypnotizability consisted of positive responses to test suggestions, e.g. suggestions of body sway and hand levitation. By thus confounding the experimental treatments with pre-existing differences among subjects with respect to hypnotizability or "suggestibility," Salzberg failed to ascertain whether Groups 1 and 2 were more responsive than Group 3 to task motivational suggestions because they (a) received the suggestions after they had received a hypnotic induction or (b) were more responsive to suggestions initially.

Fowler (1961) worked with 40 selected hypnotizable students. Each was pretested on Form I of the Iowa Silent Reading test and the Otis Mental Ability test. The subjects were then randomly assigned to two groups and retested on Form II. One group was given a hypnotic induction together with task motivational instructions of enhanced concentration, comprehension, memory, and accuracy. The other group was given similar task motivational instructions without a hypnotic induction. Both groups manifested improved retest performance on the reading test but not on the mental ability test. The two groups did not differ significantly on the degree of improvement shown on the reading test. Although this experiment seemed to indicate that task motivational instructions facilitate reading performance when given with and

also without a hypnotic induction, it failed to demonstrate this point conclusively. Because a control group was not retested without task motivational instructions, the possibility was not excluded that improved retest performance was due to familiarity with or practice on the task.

Parker and Barber (1964) pretested their subjects on three tasks: Digit Symbol Substitution adapted from the Wechsler-Bellevue; the Abstract Reasoning task from the Differential Aptitude Test Battery; and a Memory for Words task. Retests on equivalent forms of the tasks were given under the following three experimental treatments with 10 "suggestible" subjects (each had obtained relatively high scores on the BSS) randomly assigned to each treatment. Treatment 1 included only task motivational instructions: "If you try real hard, you will do better. Everyone who has tried harder on these tests has done better the second time and I'm sure you can too. . . ." Treatment 2 consisted of a hypnotic induction procedure followed by task motivational instructions. Treatment 3 (Control) did not include either the hypnotic induction or the task motivational instructions. A fourth group of 10 nonsuggestible subjects (who had previously obtained relatively low scores on the BSS), was retested under Treatment 1 (task motivational instructions). Analyses of covariance showed that the retest performance of the four groups did not differ significantly on the Memory for Words or the Abstract Reasoning tasks. However, subjects under Treatments 1 and 2 showed significantly enhanced retest performance on the Digit Symbol Substitution task as compared to the controls, that is, the task motivational instructions produced equivalent enhancement of performance in both suggestible and nonsuggestible subjects. Similarly, those who had received and those who had not received the hypnotic induction showed equivalently enhanced performance after task motivational instructions.

Reduced Pain Reactivity ("Analgesia")

In a recent experiment by Barber and Hahn (1962), the dependent variables were subjective responses and physiological responses to a pain-producing stimulus (im-

mersion of a hand in freezing water, at 2 degrees centigrade, for 3 minutes). Forty-eight subjects who had been previously rated as suggestible (obtaining relatively high scores on the BSS) were assigned at random to four treatment groups with 12 subjects per group. One group received a standardized hypnotic induction procedure (which included the four variables listed in Table 1) followed by suggestions of hand anesthesia administered for 1 minute: "The hand is losing all feeling, all sensation, it is becoming more and more numb, you will be unable to feel anything at all with it. . . ." Upon completion of the anesthesia suggestions, the hand was exposed to the pain-producing stimulus. A second experimental group (task motivation) received an experimental treatment consisting of 1-minute instructions designed to motivate the subjects to imagine a pleasant situation when exposed to the noxious stimulation—e.g., "If you try to imagine that the water is pleasant and try to think of it as *not* uncomfortable, you will be able to keep your hand in the water without being bothered by it at all. . . . I'm sure that you'll be able to continue imagining this and that you will not fail the test." Two additional groups did not receive special instructions: one group (Uninstructed) was exposed to the noxious stimulus and the other (Control) was exposed to a nonpainful stimulus (immersion of the hand in water at room temperature). The group receiving the hypnotic induction and the group receiving the task motivational instructions did not differ significantly in either subjective reports of pain experienced or in four physiological responses to the noxious stimulus that were monitored by a polygraph (heart rate, forehead muscle tension, respiratory irregularities, and skin resistance). As compared to the uninstructed treatment, both the hypnotic induction and the task motivational treatments were effective in attenuating pain reactivity, as indicated by subjective reports and by reduction in respiratory irregularities and forehead muscle tension. However, under both the hypnotic induction and the task motivational treatments, subjects reported more discomfort and pain and showed faster heart rate and lower skin resistance than the control sub-

jects who received the nonpainful stimulus. In brief, the results indicated that subjective responses and physiological responses to a pain-producing stimulus can be reduced to a comparable degree (but are not abolished) by (a) administering suggestions of anesthesia immediately upon completion of a hypnotic induction procedure or by (b) administering instructions, without a preceding hypnotic induction, designed to motivate the subject to imagine vividly a pleasant situation when exposed to noxious stimulation.

The pain-reducing effect obtained in the above experiment with the hypnotic induction treatment is consistent with previous studies in this area, reviewed elsewhere (Barber, 1963). The effects obtained with the task motivational treatment are generally in line with previous studies (Brown & Vogel, 1938; Shor, 1962; Sutcliffe, 1961) which failed to find significant differences in physiological responses to pain-producing stimuli under a "hypnotic anesthesia" treatment and a "waking" treatment that included instructions to try not to react to painful stimulation.

Suggested Deafness

A series of experimental studies (e.g., Erickson, 1938a, 1938b; Kline, Guze, & Haggerty, 1954; Malmö, Boag, & Raginsky, 1954; Pattie, 1950; Sutcliffe, 1961), reviewed in detail elsewhere (Barber, 1964c), demonstrated that suggestions of deafness given subsequent to a hypnotic induction procedure are at times effective in eliciting subjective reports that auditory stimuli either were not perceived at all or were perceived as reduced in intensity. In each of these experiments, suggestions of deafness were given together with a hypnotic induction, but similar suggestions of deafness were not given without a hypnotic induction. Barber and Calverley (1964f) included this needed comparison condition in an experiment designed to answer three questions: (a) Are suggestions of deafness effective in producing partial or total "subjective deafness" when given immediately upon completion of a "hypnotic induction?" (b) Are suggestions of deafness also effective when given to a group that has received only task motivational instructions? (c) Does sub-

jective deafness produce objective consequences that are similar to, or identical with, the objective effects of actual deafness?

Delayed auditory feedback, by which the subject's utterances are delayed for a fraction of a second, amplified, and returned to his ears through a headphone, was used to assess the objective consequences of subjective deafness. (Previous studies, reviewed by Yates, 1963, had shown that, in the individual with normal hearing, delayed auditory feedback produces speech disturbances such as stuttering, mispronunciations, increased vocal intensity, and slowed rate of speaking.) Forty-two women college students were given a pretest on Form A of the Gilmore Oral Reading test with delayed feedback. Retests on Form B, also with delayed feedback, were given under three experimental treatments, with 14 subjects assigned at random to each treatment. Subjects allocated to Treatment 1 received a standardized 15-minute hypnotic induction procedure (which included the variables listed in Table 1) followed by suggestions of deafness ("you will be deaf to your voice, you will not hear your voice coming back to you, you will not hear anything at all . . ."). Subjects allocated to Treatment 2 were given "task motivational instructions" together with deafness suggestions ("I want you to ignore and be deaf for your voice coming back to you . . . you must try hard, try very hard. It can be done, so please, I do not want you to disappoint me . . ."). Subjects allocated to Treatment 3 (Control) were retested without receiving either a hypnotic induction or deafness suggestions. Significantly more subjects reported "partial deafness" (sounds were perceived as reduced in intensity) or "total deafness" (sounds were not heard at all) under Treatment 2 (93%) than under Treatment 1 (64%). Subjects under both Treatment 1 and 2 who claimed partial or total "deafness" responded to the delayed auditory feedback of their speech in the same way as subjects under Treatment 3 (Control) who heard normally, that is, with stuttering, mispronunciations, slowed rate of speaking, and increased vocal intensity. In brief, this experiment indicated that: (a) subjective reports of partial or total deafness can be elicited more effectively by simply instructing subjects under a "waking"

experimental treatment to try to the best of their ability not to hear rather than by administering suggestions of deafness under a hypnotic experimental treatment; and (b) the objective effects of partial or total "suggested deafness," as evaluated by the method of delayed auditory feedback, closely resemble the objective effects of normal hearing and appear to be markedly dissimilar to the effects of actual deafness. Further studies are clearly needed to confirm these striking experimental results.

Suggested Salivation

The dependent variables in most of the above experiments consisted of subjective responses and overt behavioral responses to test suggestions. A recent experiment by Barber, Chauncey, and Winer (1964) carried out along similar lines as those described above, used a physiological response—salivary secretion to suggested stimuli—as the dependent variable. This experiment set out to confirm and extend previous studies (Bowles & Pronko, 1949; Pronko & Hill, 1949) which indicated that, in subjects who have received a hypnotic induction, suggested taste stimuli tend to affect salivary secretions in a similar manner as actual gustatory stimuli, e.g., suggestions that an acid solution is tasteless tend to depress the salivary secretory response to an acid solution placed on the tongue, and suggestions that water has a sour taste tend to elevate the salivary response to water. Barber et al. (1964) asked: (a) Are suggestions designed to produce positive motivation to imagine vividly that an acidic solution is tasteless or that water is sour effective in depressing and elevating salivary secretions, respectively? (b) Are such suggestions more effective when given with, or when given without, a preceding hypnotic induction procedure? Under counterbalanced hypnotic induction and non-hypnotic induction conditions, 16 subjects were given brief instructions designed to produce positive motivation to imagine vividly the suggested taste stimuli ("Disregard the actual taste of the solution we are using today, and vividly imagine that [an acidic solution is tasteless or that water is sour] . . . continue to imagine vividly . . . to the very best of your ability . . ."). The

results indicated that: the parotid gland salivary response to the acidic solution was depressed by the suggestion that the solution was tasteless whereas the response to water was enhanced by the suggestion that the water was sour; and the effects of suggestions on salivation were not significantly different under the hypnotic induction and the nonhypnotic induction conditions.

Colorblindness, Amnesia, Imagined Pain Stimulation, Dreaming on a Specified Topic, and Time Distortion

Other recent experiments, carried out along similar lines as those described above, appear to indicate the following:

1. Very similar responses to the Ishihara Colorblindness test can be elicited either by (a) administering a hypnotic induction and suggestions of red-, green-, or total-colorblindness or by (b) instructing subjects who have not received a hypnotic induction to try to ignore the colors red or green or to try to respond as if they are colorblind (Barber, 1964c; Barber & Deeley, 1961; Bravin, 1959; Rock & Shipley, 1961).

2. Suggestions to forget preceding experimental events are as effective, if not more effective, with "awake" subjects than with hypnotized subjects in producing subjective reports of amnesia (Barber & Calverley, 1962, 1964m).

3. Several physiological responses that are characteristically evoked by a cold-pain stimulus (increased heart rate and forehead muscle tension and a tendency toward reduction in skin resistance) can be elicited with or without a preceding hypnotic induction by instructions designed to motivate the subject to try to imagine vividly the cold and painful stimulus (Barber & Hahn, 1964). However, contrary to the general trend of the experiments reviewed above, instructions to imagine the cold-pain stimulus were more effective in this experiment in eliciting subjective reports of discomfort and pain when given with, rather than without, a hypnotic induction.

4. Direct suggestions to dream the following night on a specified topic appear to be about as effective when given without as when given with a preceding "hypnotic induction" in eliciting reports of having dreamed on the

suggested topic (Barber, 1962d; Barber & Calverley, 1962; Fisher, 1953).

5. Subjective reports indicative of "time distortion" can be elicited from the majority of volunteer experimental subjects, with or without a preceding hypnotic induction, by suggestions that a brief period will seem to be a long period of time (Barber & Calverley, 1964j).

Theoretical Considerations

By and large the experiments summarized above appear to indicate two interrelated conclusions: (a) Task motivational instructions, given with or without a preceding hypnotic induction procedure, tend to facilitate performance on tests of strength and endurance, tend to produce enhanced proficiency on some intellectual tasks (such as Digit Symbol Substitution), and tend to facilitate the elicitation of several singular physiological effects (such as salivary secretions to imagined gustatory stimuli). (b) Response to a variety of test suggestions—e.g., response to the BSS, and to suggestions of deafness, visual and auditory hallucinations, and reduced pain reactivity—can be facilitated by two sets of variables: one set subsumed under the label hypnotic induction procedure and the other set subsumed under the label task motivational instructions. The latter conclusion raises an important question for theories of hypnotic behavior: do these two sets of variables facilitate response to test suggestions by similar or by dissimilar processes?

It may be that dissimilar intervening processes are involved. For instance, it may be that procedures of the type labeled as hypnotic inductions (as outlined in Table 1) produce heightened suggestibility by giving rise to a hypnotic state or "trance state," whereas task motivational instructions facilitate suggestibility by other processes that do not involve a "hypnotic trance state." On the other hand, it may be that both hypnotic induction procedures and task motivational instructions facilitate suggestibility by giving rise to a hypnotic state. It could also be, of course, that both hypnotic induction procedures and task motivational instructions produce enhanced suggestibility by processes that do *not* involve a trance state. These hypotheses are

difficult if not impossible to prove or disprove at the present time. Criteria for denoting the presence or absence of the hypnotic state or trance are not only ambiguous but also differ among investigators and the same investigator sometimes uses different criteria at different times. Researchers have sought a physiological index of the trance state or the hypnotic state for nearly a century but have failed to find one (Barber, 1961b, 1964e). Since a physiological index is not available, present-day investigators generally use one or both of the following behavioral criteria to denote the presence of hypnosis or hypnotic trance:

1. At times investigators categorize a subject as being in hypnosis or trance if he shows a high level of response to test suggestions of the type included in the Stanford Hypnotic Susceptibility Scale or the BSS, e.g., test suggestions of body immobility, hallucinations, and amnesia. When the term is used in this way the supposed antecedent variable (hypnotic trance) is inferred from the consequent or dependent variable (positive response to test suggestions). This usage is tautological: a person is said to respond to test suggestions because he is in hypnotic trance and he is said to be in hypnotic trance because he responds to test suggestions. (Denoting the hypnotic state operationally, by referring to the administration of a hypnotic induction procedure is, of course, also tautological.)

2. At other times a subject is said to be hypnotized or to be in the hypnotic state or in trance if he manifests such signs or characteristics as rigid facial expression, disinclination to talk, "literal-mindedness," and lack of spontaneity and initiative (Erickson, Hershman, & Secter, 1961, pp. 55-58; Ludwig & Lyle, 1964; Pattie, 1956, p. 21; Weitzenhoffer, 1957, p. 212). Difficulties arise when hypnotic trance is inferred from these characteristics and is then used as a construct to explain high response to test suggestions of body immobility, hallucination, amnesia, and so on. For instance, these supposed signs of trance may themselves be responses to suggestions of relaxation, drowsiness, sleep, and passivity given during the "induction" procedure. (If this is the case, then all that is being said is that subjects who are responsive to cer-

tain types of suggestions, e.g., suggestions of drowsiness and passivity, are also responsive to other types of suggestions, e.g., suggestions of body immobility, hallucination, and amnesia.) Furthermore, (a) some subjects who manifest these supposed characteristics of trance are unresponsive to test suggestions (Barber, 1957, 1963); (b) some subjects respond to test suggestions without manifesting these supposed signs of trance (Barber & Calverley, 1962, 1963a, 1963b, 1963c; Kloppe, 1961); and (c) when subjects who are responsive to test suggestions show these trance characteristics, the characteristics can be removed by explicitly or tacitly suggesting to the subject that he no longer show them, and many subjects will continue to manifest a high level of response to test suggestions (Barber, 1958, 1962c; Gill & Brenman, 1959, p. 36; S. Fisher, 1954). These and other considerations presented elsewhere (Barber, 1964a) suggest that, at the present time, the term hypnotic state or trance is too nebulous and too difficult to denote clearly to be used to explain the enhanced suggestibility that is characteristically produced by hypnotic induction procedures and by task motivational instructions.

There are alternative formulations available to explain the heightened level of response to test suggestions that is typically produced by these two sets of variables. One alternative formulation posits that the two sets of variables tend to facilitate suggestibility in that one (task motivational instructions) includes explicit suggestions and the other (hypnotic induction) includes both explicit and implicit suggestions to the effect that the subject can manifest high response to test suggestions and is expected to cooperate and to try to respond maximally.

This alternative formulation is based on the following reasoning. Hypnotic induction procedures typically include explicit motivational suggestions together with suggestions that the subject can now easily respond to test suggestions (Variables 2 and 4 as listed in Table 1). However, even when such suggestions are not included in the hypnotic induction, the remaining components of the induction—defining the situation to the subject as hypnosis and administering suggestions of

eye-heaviness, eye-closure, relaxation, drowsiness, and sleep (Variables 1 and 3 as listed in Table 1)—may be sufficient to constitute an implicit task motivational procedure. It appears possible that when literate individuals in Western culture are told that they are participating in a hypnosis experiment and that they are going to be hypnotized, they are being told implicitly that they are participants in an unusual and important experiment in which they are expected to cooperate and, if they cooperate, they will find it easy to respond to test suggestions. Furthermore, since literate individuals are aware that suggestions of eye-heaviness, relaxation, drowsiness, and sleep are supposed to induce hypnosis, the administration of such suggestions serves to emphasize to them that the situation is hypnosis in which high response to test suggestions is not only possible but is also desired and expected.

A deduction from the above formulation can be tested experimentally. If Variables 1 and 3 (see Table 1) facilitate responsiveness to test suggestions by implicitly suggesting to the subject that he can respond well and is expected to try to respond maximally, then an experimental treatment consisting of these two variables should facilitate suggestibility only among subjects who are familiar with the traditional implications of the word hypnosis, that is, who associate the word hypnosis with high suggestibility and who believe that suggestions of eye-heaviness, relaxation, drowsiness, and sleep are effective in producing hypnosis. This deduction can be tested with a group of subjects, say nursery school or elementary school children, of whom some are and some are not familiar with the traditional connotations of the word hypnosis. The present formulation predicts that: (a) Both a task motivational treatment and a treatment consisting of Variables 1 and 3 will facilitate response to test suggestions among children who are acquainted with the cultural connotations of the word hypnosis. (b) A task motivational treatment, but *not* a treatment consisting of Variables 1 and 3, will facilitate suggestibility among children who have not as yet learned to associate the word hypnosis with high suggestibility and who have not as yet learned that suggestions of eye-heaviness, relaxation,

drowsiness, and sleep are supposed to produce hypnosis and high suggestibility.

Effective Variables in "Hypnotic Induction" and "Task Motivational Instructions"

To state that both hypnotic induction procedures and task motivational instructions typically produce heightened response to test suggestions does not answer a crucial question: which of the many independent variables subsumed under these broad categories are instrumental and which extraneous in producing this effect? As Table 1 shows, the hypnotic induction procedures used in the experiments reviewed above typically included at least four independent variables. It may be that only one or two of these four variables are effective in facilitating suggestibility. Task motivational instructions also include more than one independent variable. The task motivational instructions used in the above experiments were typically comprised of: (a) motivational suggestions per se: "How well you do on the tests which I will give you depends entirely upon your willingness to try. . . . What I ask is your cooperation . . ."; and (b) suggestions that the subject can easily perform well and can easily experience the suggested effects: "Everyone passed these tests when they tried . . . you can easily imagine and do the interesting things I tell you. . . ." The first isolable variable included in task motivational instructions (motivational suggestions per se) is very similar if not identical to Variable 2 in hypnotic induction procedures, and the second variable included in task motivational instructions (suggestions that it is easy to respond well) is very similar if not identical to Variable 4 typically included in hypnotic inductions (see Table 1). Were both of these variables instrumental in facilitating suggestibility or was one variable effective and the other relatively ineffective?

A series of recent experiments, summarized below, were conducted (a) to ascertain which of the four independent variables typically included in hypnotic induction procedures are instrumental in facilitating response to test suggestions, and (b) to delineate the interactive effects of these variables in various combinations. As a by-product, these experiments also evaluated the effects on suggestibility of

the two independent variables included in task motivational instructions that are practically indistinguishable from Variables 2 and 4 that are included in hypnotic inductions.

Effects of Variables 1 and 4. Glass and Barber (1961) presented data indicating that a higher level of response to the BSS is obtained when the experimental situation is defined to the subject as hypnosis rather than as "a control experiment involving a test of imagination." In a more extensive experiment, Barber and Calverley (1964k) appraised the main effects and the interactive effects on suggestibility of defining the situation to the subject as hypnosis (Variable 1) and also of suggesting to the subject that he will find it easy to perform well on the tests (Variable 4). The Barber and Calverley experiment was designed as a 2×2 factorial with each independent variable at two levels: definition of the experimental situation as hypnosis or as control, and suggestions that it would be easy or difficult to respond to the tests. Ninety-six students, who were required to participate in the experiment in fulfillment of course requirements, were randomly assigned to four experimental groups with 24 subjects per group. Groups A and B were told "You have been selected by chance to be in the hypnosis group and you are going to be hypnotized," whereas Groups C and D were told "You have been selected by chance to be in the control group and you will not be hypnotized." Groups A and C were next told that it was easy to respond to the tests whereas Groups B and D were told that it was difficult to pass the tests. Immediately following these instructions all subjects were assessed on the BSS (as summarized in Table 2). (To control possible experimenter bias in assessing suggestibility among the various groups, the BSS was administered to all subjects by means of a tape-recording of the experimenter's voice.) The main effects of both independent variables were significant: higher objective and subjective scores on the BSS were obtained when the situation was defined as hypnosis rather than as control, and when response to the tests was described as easy rather than as difficult. The suggestibility-enhancing effects of the independent variables were additive: the level of suggestibility was highest when

the situation was defined to the subject as hypnosis and response to the tests was described as easy (Group A); next highest when *either* the situation was defined as hypnosis *or* response to the tests was described as easy (Groups B and C); and lowest when the situation was defined to the subject as a "control experiment" and response to the tests was described as difficult (Group D).

Barber and Calverley noted that further studies are required to specify the intervening processes by which describing the experiment as hypnosis or stating that it is easy to respond to test suggestions produce a higher level of suggestibility than describing the situation as a control experiment or stating that it is difficult to respond to the tests. They suggested that such studies should attempt to assess the subject's interpretation of the instructions, and they postulated that, (a) when subjects are told that they have been assigned to the control group or that the test suggestions are difficult to pass, they may interpret these statements to mean that they are *not* expected to respond to suggestions of arm levitation, body immobility, selective amnesia, and so on, whereas (b) when they are told that they have been assigned to the hypnosis group or that the test suggestions are easy to pass they may interpret these statements to mean that they are expected to respond positively to such suggestions.

Effects of Variables 1, 2, and 4. Barber and Calverley (1965a) subsequently conducted an experiment with 136 subjects which replicated and extended the above study. This experiment was designed as a $2 \times 2 \times 2$ factorial with three independent variables—Variables 1, 2, and 4 as listed in Table 1—each at two levels. Instructions for the two levels of Variable 1 were "You have been selected by chance to be in the hypnosis group and you are going to be hypnotized" versus "You have been selected by chance to be in the control group . . . you will not be hypnotized . . . I'm going to give you several tests of imagination." The two levels of Variable 2 consisted of the presence and absence of motivational instructions: "Please try hard. . . . If you don't try, the experiment will be worthless. . . ." Instructions for one level of Variable 4 (suggestions that it is easy to respond

to the tests) were the same as in the preceding experiment; however, instructions for the second level of Variable 4 differed from that of the preceding experiment in that, instead of suggestions that it would be difficult to respond to the tests, nothing was said concerning the ease or difficulty of responding. All subjects were assessed on subjective and subjective responses to the BSS (see Table 2). (To control experimenter bias, the BSS was administered to all subjects by means of a tape recording.)

Confirming the results of the preceding experiment, subjects told "You are in the hypnosis group" obtained higher objective and subjective scores on the BSS than those told "You are in the control group. . . . I'm going to give you several tests of imagination." The main effect of Variable 2 (motivational instructions) was significant. However, a significant triple interaction indicated that motivational instructions consistently facilitated response to the BSS when the situation was defined as control but did not consistently facilitate response when the situation was defined as hypnosis. The main effect of Variable 4 (suggesting or not suggesting that it is easy to respond to the tests) was nonsignificant. However, the significant triple interaction indicated that suggestions that it is easy to respond to the tests tended to enhance the scores on the BSS when the situation was defined as a "control experiment" and motivational instructions were also administered. Multiple comparisons of the group means showed that correspondingly high objective and subjective scores on the BSS can be produced either by (a) defining the situation to the subject as hypnosis (Variable 1), with or without Variables 2 and 4, or by (b) defining the situation as a "control experiment involving a test of imagination," and in addition administering motivational instructions and suggestions that it is easy to respond to the tests (Variables 2 and 4).

Effects of Variables 1, 3, and 2 and 4. In addition to Variables 1, 2, and 4 which were evaluated in the above experiment, hypnotic induction procedures typically include an additional variable, namely, repeated suggestions of relaxation, drowsiness, and sleep (Variable 3). Barber and Calverley (1965a) subse-

quently conducted a further study to ascertain whether this additional variable is effective in elevating responsiveness to test suggestions as compared to (a) simply defining the experimental situation to the subject as hypnosis (Variable 1), and to (b) administering motivational instructions together with suggestions that the subject can easily respond to the tests (Variables 2 and 4). Seventy-four college student volunteers were randomly assigned to five experimental groups. With respect to Groups A, B, C, and D the situation was defined as hypnosis and suggestions of relaxation, drowsiness, and sleep were administered for 0, 1, 5, and 10 minutes, respectively. With respect to Group E, the situation was defined as a control experiment, response to the tests was described as easy, and motivational instructions were administered. Objective and subjective responses to the BSS constituted the dependent variables (see Table 2). (To control possible experimenter bias in administering the test suggestions, the BSS was given to all subjects by a tape recording.) The mean objective and subjective scores of Group A were significantly smaller than the mean scores of Groups B, C, D, and E and the mean scores of the latter four groups did not differ significantly from each other. The results thus indicated that: (a) Variable 3 (suggestions of relaxation, drowsiness, and sleep administered for either 1, 5, or 10 minutes) in combination with Variable 1 (defining the situation as hypnosis) is more effective than Variable 1 alone in producing high response to test suggestions; (b) suggestions of relaxation, drowsiness, and sleep administered for 5 minutes or for 10 minutes are not noticeably more effective in facilitating response to the BSS than the same suggestions administered for 1 minute; and (c) Variables 2 and 4 in combination (motivational instructions together with suggestions that the subject will find it easy to perform well on the tests) appear to be as effective as Variables 1 and 3 in combination in facilitating response to test suggestions.

Effects of Variables 3, 2 and 4. In a further experiment, Barber and Calverley (in press) held Variable 1 constant (that is, the situation was defined to all subjects as hypnosis) while experimentally manipulating Variables

3, 2, and 4. Fifty-six student nurse volunteers were randomly assigned to four experimental groups with 14 per group. The experimental treatment for Groups A and B included Variable 2 (motivational instructions) and Variable 4 (suggestions that it is easy to respond to the tests). The experimental treatment for Groups A and C included Variable 3 (5 minutes of suggestions of eye-heaviness, eye-closure, relaxation, drowsiness, and sleep). The dependent variables were responses to the BSS. (To control possible experimenter bias, the BSS was administered by a tape recording.) As compared to the control treatment that did not include either Variables 3 or 2 and 4 (Group D), the treatment comprised of Variables 2 and 4 (Group B) and also the treatment comprised of Variable 3 (Group C) were both effective in augmenting objective and subjective scores on the BSS. However, the suggestibility-enhancing effects of Variable 3 and of Variables 2 and 4 were not additive: Group A (Variables 3, 2, and 4) did not show a higher level of response than Group C (Variable 3) or Group B (Variables 2 and 4). Stated otherwise, (a) motivational instructions together with suggestions that it is easy to respond to the tests and (b) suggestions of relaxation, drowsiness, and sleep were equally effective in producing a high level of response to test suggestions, and *a* and *b* in combination were not more effective than either *a* or *b* alone.

Conclusions from the above experiments. In general, the results of the four experiments summarized in this section appear to indicate the following:

1. It appears that simply defining the experimental situation to the subject as hypnosis tends to produce an increment in responsiveness to test suggestions. With other experimental variables counterbalanced across groups, subjects told that they are to be hypnotized tend to be more responsive to suggestions of arm levitation, thirst hallucination, body immobility, selective amnesia, and so on, than subjects told that they are to receive a test of imagination and will not be hypnotized.

2. Further increments in response to test suggestions can be produced by administer-

ing the following suggestions or instructions, in addition to defining the situation to the subject as hypnosis: suggestions of eye-heaviness, relaxation, drowsiness, and sleep; or motivational instructions together with suggestions that it is easy to respond to the tests.

3. When the situation is defined to the subject as hypnosis, motivational instructions together with suggestions that it is easy to respond to the tests (Variables 2 and 4) appear to be as effective in facilitating response to test suggestions as suggestions of eye-heaviness, relaxation, drowsiness, and sleep (Variable 3). The enhanced suggestibility produced by these two sets of variables, however, does not appear to be additive; an experimental treatment that includes Variable 3 and also Variables 2 and 4 does not seem to produce a higher level of response to the BSS than an experimental treatment that includes only Variables 3 or only Variables 2 and 4.

4. Although defining the situation to the subject as hypnosis tends to produce a higher level of response to test suggestions than defining the situation as a control experiment, this does not mean that a high level of response cannot be elicited when the situation is defined as control. However, to elicit high response to test suggestions from subjects who have been told that they have been assigned to a control group and will not be hypnotized, it appears necessary to administer additional instructions and suggestions, for instance, motivational instructions and suggestions that it is easy to respond to the tests. Furthermore, the available data appear to indicate that comparable high levels of response to test suggestions can be elicited either by (a) administering suggestions of relaxation, drowsiness, and sleep in a situation defined to the subject as hypnosis, or by (b) administering suggestions that the tests are easy to pass together with motivational instructions in a situation defined to the subject as a "control experiment involving a test of imagination."

It needs to be emphasized that these conclusions are derived from experiments that employed response to the BSS as the dependent variable. Further studies are needed to confirm and extend these findings using

as dependent variables not only response to the BSS but also response to other test suggestions not included in this scale such as suggestions of analgesia, age-regression, and visual and auditory hallucinations.

PART II. EFFECTS ON SUGGESTIBILITY OF PERSONALITY VARIABLES AND SEVERAL RELATIVELY SUBTLE INSTRUCTIONAL-SITUATIONAL VARIABLES

To formulate a general theory of hypnotic behavior it is necessary to specify which of the many independent variables typically present in hypnotic experimental situations play an important role and which play a relatively minor or unimportant role in determining response to test suggestions of body immobility, hallucination, amnesia, and so on. The experiments reviewed above point to several variables that seem to exert an important effect. Two series of experiments are reviewed next. The first series succeeded in isolating several additional instructional-situational variables that also seem to affect response to test suggestions. The second series indicates that personality variables and several instructional-situational variables, which have been postulated to play a significant role in determining response to test suggestions, do not seem to exert a major effect when tested experimentally.

Variables Affecting Response

Experimenter's tone of voice in administering suggestions. Barber and Calverley (1964d) assessed response to test suggestions while varying the tone of voice in which the suggestions were presented. Student nurse volunteers were randomly assigned to Groups A and B with 41 to each group, and the experimenter presented the BSS in a forceful tone to Group A and in a lackadaisical tone to Group B. (Two psychologists and one sociologist, who were not informed as to the design of the experiment, agreed in rating one presentation as firm and forceful and the other presentation as listless and lackadaisical.) Group A on the average passed approximately 4 of the 8 test suggestions whereas Group B passed approximately 2. Further, although the subjects were randomly allocated from a homogeneous population to

the two experimental groups, the proportion manifesting "high" suggestibility (scores of 5.5 or above on the 8-point BSS) varied from 34% (Group A) to 12% (Group B); and the proportion manifesting "low" suggestibility (scores of 1.5 or less) varied from 20% (Group A) to 49% (Group B).

Positive and negative attitudinal-motivational instructions. In a further experiment Barber and Calverley (1964e) obtained data indicating that high and low levels of response to test suggestions can be obtained by administering instructions designed to produce positive and negative attitudes and motives with respect to the test situation. Twenty-four student nurses, who had been rated on response to the BSS in a preliminary session, were randomly allocated to three experimental groups with 8 per group. Group 1 (Positive instructions) was retested on the BSS after receiving motivational instructions together with suggestions that it is easy to respond to the tests. Group 2 (Neutral instructions) was retested on the BSS in the same way as all subjects had been tested in the preliminary session, that is, without special instructions. Group 3 (Negative instructions) was retested on the BSS after being told the following by a prestigious person (the Supervisor of Student Nurses):

It's being rumored by doctors and administrators, and I don't know who else, that nursing students are too easily directed and easily led in their responses to Dr. Calverley's suggestions. It's kind of shocking and discouraging to hear that the students, up to this time, are so easily directed and can't decide things for themselves. We've got a job to do; to impress the administrators and doctors around here with the fact that nursing students are not as gullible and as easily directed as they appear to have been showing during this research study. Well it sure is up to each of you as to how easily led people around here think student nurses are.

Although subjects allocated to Groups 1, 2, and 3 had obtained very similar mean scores on the BSS in the preliminary session (passing approximately 3 of the 8 test suggestions), their scores on retest differed markedly. On the average, Group 1 (Positive instructions) passed 4 of the test suggestions, Group 2 (Neutral instructions) passed 2, and with the exception of one subject who passed one test, all subjects in Group 3 (Negative in-

structions) obtained zero scores on the BSS. It should be noted that, depending on whether positive or negative instructions were administered, the number of subjects who were *not* suggestible in the formal experimental situation (that is, who responded to none of the eight test suggestions included in the BSS) varied from 88% (Group 3) to 0% (Group 1).

What subjects are told is the purpose of the experiment. Barber and Calverley (1964c) demonstrated that clear-cut variations in response to standardized test suggestions can be produced by varying what the subject is told is the purpose of the experiment. Seventeen student nurses were randomly assigned to Group A and 16 to Group B. Group A was told that the purpose of the experiment was to test imagination whereas Group B was told that the purpose was to test gullibility. Both groups were assessed on response to the BSS. (To control possible experimenter bias in administering the test suggestions, the BSS was administered to all subjects by means of a tape recording.) Forty-one percent of the subjects in Group A and only 6% in Group B obtained relatively high scores of 5 or above on the 8-point BSS.

Suggestions implying that the procedure to be used is or is not effective in producing "hypnosis." Barber and Calverley (in press) recently reported an experiment that included two independent variables, each at two levels. The two levels of one independent variable were suggestions implying that the procedure to be employed is or is not effective in producing hypnosis. The two levels of the second independent variable were presence versus absence of suggestions of eye-heaviness, relaxation, drowsiness, and sleep administered for 5 minutes by a tape recording. Eighty-four student nurses and practical nurses were required to participate in the hypnosis experiment as part of course requirements. These "captive" subjects were randomly assigned to the four cells comprising the 2×2 factorial, with 21 per cell. The dependent variables were objective and subjective scores on the BSS (Table 2). (To control possible experimenter bias, the BSS was administered to all subjects by means of a tape recording.) The overall results were:

(a) Suggestions implying that the procedure to be used is effective in producing hypnosis gave rise to a higher level of objective and subjective responses to the BSS than suggestions implying that the procedure to be used is not effective in inducing hypnosis. (b) In harmony with previous studies, suggestions of eye-heaviness, relaxation, drowsiness, and sleep were effective in elevating response to test suggestions. (c) Suggestions implying that the procedure to be used is or is not effective in inducing hypnosis exerted a more potent effect on response to the BSS than the presence or absence of suggestions of eye-heaviness, relaxation, drowsiness, and sleep.

Variables Not Exerting an Important Effect on Response

Transsituational personality characteristics. A large number of investigations have been conducted to test the hypothesis that enduring characteristics of personality exert an important effect on hypnotizability or suggestibility. In these studies hypnotizability and suggestibility were generally denoted operationally by assessing subjects' level of response to standardized test suggestions administered with and without a preceding hypnotic induction procedure, respectively. Personality variables were assessed by: (a) projective techniques (Doland, 1953; Sarbin & Madow, 1942; Stukat, 1958); (b) ratings, autobiographies, and clinical interviews (Gill & Brenman, 1959, pp. 81-83; Hilgard & Hilgard, 1962); (c) self-report questionnaires concerning the nature and degree of the subject's previous imaginative-fantasy or hypnotic-like experiences (As, 1962; Barber & Calverley, 1965b; Shor, Orne, & O'Connell, 1962); and (d) standardized inventories such as the MMPI, the Guilford-Zimmerman Temperament Survey, the Maudsley Personality Inventory, the Edwards Personal Preference Schedule, and the Leary Interpersonal Check List (Barber, 1956; Barber & Calverley, 1964g, 1964h, 1964i; Faw & Wilcox, 1958; Furneaux & Gibson, 1961; Hilgard & Bentler, 1963; Sector, 1961; Weitzenhoffer & Weitzenhoffer, 1958). The many investigations in this area, including the ones cited and approximately 50 others which were

recently reviewed elsewhere (Barber, 1964d), either failed to find significant differences in personality characteristics between subjects ranking high and low on hypnotizability or suggestibility or else reported conflicting findings.

To what can we attribute this overall failure to find attributes of personality which are consistently related to responsiveness to test suggestions? It may be that subtle aspects of personality that are related to hypnotizability or suggestibility are not tapped by present-day methods of personality assessment. However, it could also be that response to test suggestions is primarily situationally determined and that transsituational characteristics of personality may play only a very small role or may play a role only in interaction with situational variables. The latter hypothesis is in line with a series of experiments, reviewed earlier in the present paper, which indicated that variations in the experimental situation—e.g., variations in the experimenter's tone of voice when administering the test suggestions and variations in the words used to describe the purpose of the experiment to the subjects—produce clear-cut variations in subjects' responsiveness to test suggestions.

Eyes closed or open. In hypnotic experiments subjects are almost always assessed on response to test suggestions with their eyes closed. Implicit in this method of assessment appears to be the assumption that subjects are more suggestible when their eyes are closed rather than open. Barber and Calverley (1965a) evaluated this assumption as follows. Twenty-four subjects were assessed on the BSS without receiving special instructions; 12 of these, selected at random, were assessed with eyes open and the others with eyes closed. Two additional groups of 12 subjects were rated on the BSS with eyes closed and open, respectively, after receiving a standardized hypnotic induction procedure (as outlined in Table 1). (To control variations in the experimenter's tone of voice when administering the test suggestions, the BSS was given to all subjects by means of a tape recording.) Under both the hypnotic induction and the nonhypnotic induction conditions subjects were slightly more responsive but not

significantly more responsive to the test suggestions when their eyes were open rather than closed. Further studies are needed to ascertain whether this variable (eyes closed versus eyes open) exerts an important effect on response to test suggestions other than those included in the BSS, e.g., suggestions of age-regression or suggestions of enhanced memory for previous events.

Personal versus relatively impersonal administration of suggestions. In hypnosis experiments the hypnotic induction procedure and the test suggestions are almost always administered orally. Implicit in this method of administration is the assumption that a higher level of suggestibility is elicited when the test suggestions are presented in a more personal manner (as spoken by the experimenter) rather than in a relatively impersonal manner (for instance, by a tape recording). Barber and Calverley (1964b) evaluated this assumption in two experiments. In the first experiment 84 student nurses were assigned at random to two groups of 42 subjects and both groups were assessed on response to the BSS. To one group the test suggestions were presented orally by the experimenter and to the other group the identical test suggestions were presented by means of a tape recording of the experimenter's voice. The mean objective and subjective scores were slightly higher but not significantly higher under the recorded rather than under the spoken presentation. In the second experiment, 66 male dental students were randomly assigned to two groups of 33 subjects. A standardized hypnotic induction procedure and the BSS were administered to one group orally and to the other by a tape recording. The mean objective scores under recorded and spoken presentation were identical and the mean subjective scores were practically identical (cf., Hoskovec, Svorad, & Lanc, 1963).

OVERVIEW

The experiments reviewed in this paper point to several variables that appear to play an important role in producing positive responses to suggestions of hallucinations, analgesia, amnesia, body immobility, and so on, that is, in producing behaviors of the type

traditionally labeled as hypnotic. Broadly speaking, it appears that an experimental treatment of the type labeled as a hypnotic induction and also an experimental treatment labeled as task motivational instructions are both effective in eliciting hypnotic behaviors. However, both of these experimental treatments include several independent variables. Task motivational instructions include motivational instructions per se plus suggestions that it is easy to respond to assigned tasks. Hypnotic induction procedures typically include the two variables included in task motivational instructions plus two additional variables: definition of the situation to the subject as hypnosis; and suggestions of eye-heaviness, relaxation, drowsiness, and sleep.

A series of experiments has been conducted to ascertain the relative importance of these four variables in facilitating response to test suggestions. These experiments appear to indicate that:

1. Defining the situation to the subject as hypnosis tends to produce a higher level of suggestibility than defining it as a control experiment.

2. When the situation is defined to the subject as hypnosis, correspondingly high levels of response to test suggestions can be evoked either by (a) administering motivational instructions together with suggestions that it is easy to respond to the tests, (b) administering suggestions of eye-heaviness, eye-closure, relaxation, drowsiness, and sleep, or (c) administering an experimental treatment that includes both *a* and *b*.

3. It is also possible to produce a high level of suggestibility when the situation is defined to the subject as a control experiment, provided that motivational instructions and suggestions that it is easy to respond to the tests are also administered.

4. It appears that equally high levels of response to test suggestions can be elicited either by (a) administering suggestions of eye-heaviness, relaxation, drowsiness, and sleep to subjects who have been told that they are to be hypnotized, or by (b) administering motivational instructions together with suggestions that it is easy to perform well on the tasks to subjects who have been told that they are not to be hypnotized but

are to serve in a control group and are to receive tests of imagination.

The experiments cited also point to several additional instructional-situational variables that influence response to test suggestions. These include: (a) the tone of voice, in which the test suggestions are presented; (b) whether prospective subjects are told, by a prestigious person, that they should or should not respond to the suggestions that they will receive in the experiment; (c) what subjects are told is the purpose of the experiment; and (d) whether subjects, who have been told that they are participants in a hypnosis experiment, are given implicit suggestions that the procedure to be used is or is not effective in inducing hypnosis. The above experiments also indicate that the following variables, which have been postulated to play an important role in determining response to test suggestions, do not seem to be important when tested experimentally: (a) the trans-situational personality characteristics of the subject; (b) whether the test suggestions are administered to the subject with his eyes closed or open; and (c) whether the test suggestions are administered in a relatively impersonal manner (by a tape recording) or in a more personal manner (orally by the experimenter).

LIMITATIONS OF THE INVESTIGATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The results obtained in the above investigations may be valid only under certain limiting conditions. For instance, informing the subject that he is to be hypnotized may facilitate suggestibility only in certain classes of subjects, such as the college students and nursing students that were used in almost all of the experiments reviewed above, and may not facilitate suggestibility in other types of subjects, for instance, working-class adults, aged individuals or hospitalized mental patients (cf., Barber, Karacan, & Calverley, 1964). This consideration leads to the following general criticism of the investigations cited.

In most of the experiments volunteer subjects who had not been pretested on suggestibility were assigned at random to the treatments. In other experiments, however,

subjects were assigned randomly to treatments from a population that had previously manifested high response to the BSS. Further, although most of the experiments were conducted with volunteers, some were conducted with captive subjects. In addition, subjects in some experiments were college undergraduates whereas in other experiments the subjects were nursing students. The results obtained with previously untested subjects may or may not apply to subjects who have previously shown high response to test suggestions; the results obtained with volunteers may or may not apply to captives (cf., Boucher & Hilgard, 1962); the results obtained with college students may or may not apply to nursing students. Further studies are needed to ascertain whether results obtained with one type of adult sample can be generalized to other types of adult samples, and whether results which are found to hold for various samples of adults also apply to children, to adolescents, and to the aged (cf., Barber & Calverley, 1963a).

A second general criticism of the above investigations is that no attempt was made to ascertain what motives led subjects to volunteer for the experiment, how subjects perceived the experimental situation, and how they interpreted the instructions they were given. For instance, how did the subjects interpret instructions stating that they were to be hypnotized or instructions stating that they had been assigned to a control group and would not be hypnotized but would receive a test of imagination? Further studies are needed which carefully attempt to assess the motives which lead subjects to volunteer and also to assess how subjects perceive the experimental situation, how they interpret the instructions they receive, and how these "internal" variables affect objective response.

Rigorous research is also needed to appraise the effects of several additional subject variables. For instance, to what extent is response to test suggestions affected by subjects' attitude toward hypnosis? A series of experimental studies (Barber & Calverley, 1963c; Melei & Hilgard, 1964; Rosenhan & Tomkins, 1964; Secter, 1960; White, 1937; Willey, 1951) indicates that subjects holding positive attitudes toward hypnosis tend to score

slightly higher, but not always significantly higher, on test suggestions than subjects holding negative attitudes. However, these studies are not conclusive and further experimentation is needed to clarify the effects of this variable. Additional research is also needed to delineate the effects on suggestibility of the events occurring during subject recruitment and the events occurring when the subject first enters the experimental room, e.g., the subject's initial reactions to the experimental setting and to the person of the experimenter.

The subject variables mentioned above should be considered in relation to a number of experimenter variables. For instance, what are the effects of shared beliefs on the part of subject and experimenter concerning the "power of suggestions" or the "power of hypnosis"? What variance is introduced into the subject's responsiveness by the person of the experimenter—his personality characteristics, his "emotional warmth," his ethnicity, age, and sex, and his attitudes toward the experiment, toward the subject, and toward his own role as an experimenter? What bias is introduced into the experimental outcome by the experimenter's expectations, his investment in a given experimental outcome, his facial expressions, his posture and movements, and the quality, pitch, and resonance of his voice? To what extent are the experimental instructions confounded with the characteristics of the experimenter administering the instructions?

Additional research is also needed to delineate further the gross variables that were evaluated in the experiments described above. For instance, Variable 3, as evaluated in the above experiments, typically included (a) suggestions of eye-heaviness and eye-closure, (b) suggestions of relaxation, and (c) suggestions of drowsiness and sleep. It may be that only one of these three isolable factors included in Variable 3 was effective in facilitating response to test suggestions and that the other two factors did not exert an important effect. Research is needed not only to specify further the factors involved in each of the gross variables assessed in the above experiments but also (a) to isolate additional variables that affect response to

test suggestions, (b) to assign weights to the effective variables and to their interactions, and (c) to specify the processes by which the antecedent variables are instrumental in producing behaviors of the type which have been traditionally viewed as due to or associated with hypnosis.

Finally, although there is a need for a formal theory of hypnotic behavior, the writer sees no grounds for believing that an adequate theory can arise from anything but the patient analyses of experimentally manipulated variables. There is much to be done in straightforward empirical research, following up leads that are now available, before it will be profitable to attempt a formal theory. One can venture to predict that, when sufficient experimental data have accumulated, any simple formula to explain hypnotic behavior will be open to serious question. The influence of any one variable will be found to depend upon the context of other variables. The determinants of response to test suggestions will be found to be multiple and complex. Viewed in this perspective the present state of research seems primitive indeed. We have just begun to break the ground.

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